

# SAFETY DATA SHEET

## HCS-2012 APPENDIX D TO §1910.1200

Report No. E46933-CNT20160052-Li Ion-2000  
Product Name LITHIUM ION BATTERY 3.7V ISR18650 2000mAh

Issue Date 12-Jan-2016  
Revision date 10-Feb-2017

### 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### Product identifier

Product Name LITHIUM ION BATTERY 3.7V ISR18650 2000mAh  
Chemical Name LITHIUM ION BATTERY 3.7V ISR18650 2000mAh

#### Other means of identification

No information available

#### Recommended use of the chemical and restrictions on use

Recommended Use Used in power tools, flashlight  
Uses advised against No information available

#### Details of the supplier of the safety data sheet

Supplier Jiangsu Highstar Battery Manufacturing Co.,Ltd.  
Address No.306 Heping Road(s),Qidong City,Jiangsu,China  
Postal Code 226200  
Phone +86-513-80795666  
FAX +86-513-83312306  
E-mail chenj@highstar.net.cn

Importer  
Address  
Postal Code  
Phone  
FAX  
E-mail

#### Emergency telephone number

+86-513-80795666

### 2. HAZARDS IDENTIFICATION

#### GHS Classification

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

#### Label elements

Symbols/Pictograms None  
Signal word None  
Hazard Statements Not classified.  
Precautionary Statements  
Prevention None.  
Response None.  
Storage None.  
Disposal None.

#### Hazards not otherwise classified (HNOC)

No information available

#### Unknown acute toxicity

No information available

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Chemical nature</u>	Article		
Chemical Name		CAS No	Weight-%
Cobalt lithium manganese nickel oxide		182442-95-1	30 - 32
Iron		7439-89-6	22 - 23
Copper		7440-50-8	15 - 16
Graphite		7782-42-5	14 - 15
Aluminum		7429-90-5	7 - 8
Polypropylene		9003-07-0	2 - 3
Phosphate(1-), hexafluoro-, lithium		21324-40-3	2 - 3

### 4. FIRST AID MEASURES

#### Description of first aid measures

General advice	In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).
Inhalation	Not an expected route of exposure. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Skin Contact	Wash hands thoroughly after handling.
Eye contact	Not an expected route of exposure. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Ingestion	Not an expected route of exposure. If swallowed, call a poison control center or physician immediately.

#### Most important symptoms and effects, both acute and delayed

No information available.

#### Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

### 5. FIRE-FIGHTING MEASURES

#### Extinguishing media

Suitable extinguishing media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	No information available.

#### Specific hazards arising from the chemical

Thermal decomposition can lead to release of irritating and toxic gases and vapors  
Carbon oxides (CO<sub>x</sub>), metal oxides

#### Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Cool containers with flooding quantities of water until well after fire is out. Evacuate personnel to safe areas.

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions, protective equipment and emergency procedures

Evacuate personnel to safe areas. Ensure adequate ventilation, especially in confined areas. Remove all sources of ignition. Use personal protection recommended in Section 8. Avoid contact with skin, eyes or clothing. Do not touch or walk through spilled material. Avoid breathing vapors or mists.

#### Methods and material for containment and cleaning up

Prevent further leakage or spillage if safe to do so.

Pick up and transfer to properly labeled containers.

## 7. HANDLING AND STORAGE

### Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Avoid generation of dust. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid contact with skin, eyes or clothing. Wash thoroughly after handling. Use personal protection recommended in Section 8. Take precautionary measures against static discharges. Do not eat, drink or smoke when using this product.

### Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks, flame and other sources of ignition. Keep locked up and out of reach of children. Keep away from food, drink and animal feeding stuffs. Store in accordance with local regulations.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH	Denmark	European Union
Cobalt lithium manganese nickel oxide (CAS #: 182442-95-1)	TWA: 0.02 mg/m <sup>3</sup> Co TWA: 0.02 mg/m <sup>3</sup> Mn TWA: 0.1 mg/m <sup>3</sup> Mn	-	IDLH: 500 mg/m <sup>3</sup> Mn IDLH: 10 mg/m <sup>3</sup> Ni TWA: 1 mg/m <sup>3</sup> Mn TWA: 0.015 mg/m <sup>3</sup> except Nickel carbonyl Ni STEL: 3 mg/m <sup>3</sup> Mn	TWA: 0.01 mg/m <sup>3</sup> TWA: 0.2 mg/m <sup>3</sup>	-
Copper (CAS #: 7440-50-8)	TWA: 0.2 mg/m <sup>3</sup> fume TWA: 1 mg/m <sup>3</sup> Cu dust and mist	-	IDLH: 100 mg/m <sup>3</sup> dust, fume and mist IDLH: 100 mg/m <sup>3</sup> Cu dust and mist TWA: 1 mg/m <sup>3</sup> dust and mist TWA: 0.1 mg/m <sup>3</sup> fume TWA: 1 mg/m <sup>3</sup> Cu dust and mist	TWA: 1.0 mg/m <sup>3</sup> TWA: 0.1 mg/m <sup>3</sup>	-
Graphite (CAS #: 7782-42-5)	TWA: 2 mg/m <sup>3</sup> respirable fraction all forms except graphite fibers	-	IDLH: 1250 mg/m <sup>3</sup> TWA: 2.5 mg/m <sup>3</sup> natural respirable dust	TWA: 2.5 mg/m <sup>3</sup>	-
Aluminum (CAS #: 7429-90-5)	TWA: 1 mg/m <sup>3</sup> respirable fraction	TWA: 15 mg/m <sup>3</sup> total dust TWA: 5 mg/m <sup>3</sup> respirable fraction (vacated) TWA: 15 mg/m <sup>3</sup> total dust (vacated) TWA: 5 mg/m <sup>3</sup> respirable fraction (vacated) TWA: 5 mg/m <sup>3</sup> Al Aluminum	TWA: 10 mg/m <sup>3</sup> total dust TWA: 5 mg/m <sup>3</sup> respirable dust TWA: 5 mg/m <sup>3</sup> Al	TWA: 5 mg/m <sup>3</sup> TWA: 2 mg/m <sup>3</sup>	-
Phosphate(1-), hexafluoro-, lithium (CAS #: 21324-40-3)	TWA: 2.5 mg/m <sup>3</sup> F	-	-	TWA: 2.5 mg/m <sup>3</sup>	-

Chemical Name	Latvia	France	Finland	Germany	Italy
Cobalt lithium manganese nickel oxide (CAS #: 182442-95-1)	TWA: 0.05 mg/m <sup>3</sup>	-	TWA: 0.05 mg/m <sup>3</sup> TWA: 0.01 mg/m <sup>3</sup> TWA: 0.02 mg/m <sup>3</sup> TWA: 0.2 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup> TWA: 0.02 mg/m <sup>3</sup> Ceiling / Peak: 1.6 mg/m <sup>3</sup> Ceiling / Peak: 0.16 mg/m <sup>3</sup> Ceiling / Peak: 0.2 mg/m <sup>3</sup> Skin TWA: 0.5 mg/m <sup>3</sup>	-
Copper (CAS #: 7440-50-8)	TWA: 0.5 mg/m <sup>3</sup> STEL: 1 mg/m <sup>3</sup>	TWA: 0.2 mg/m <sup>3</sup> TWA: 1 mg/m <sup>3</sup> STEL: 2 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup> TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.01 mg/m <sup>3</sup> Ceiling / Peak: 0.02 mg/m <sup>3</sup> Ceiling / Peak:	-

				0.2 mg/m <sup>3</sup>	
Graphite (CAS #: 7782-42-5)	TWA: 2 mg/m <sup>3</sup>	TWA: 2 mg/m <sup>3</sup>	TWA: 2 mg/m <sup>3</sup>	TWA: 1.5 mg/m <sup>3</sup> TWA: 4 mg/m <sup>3</sup>	-
Aluminum (CAS #: 7429-90-5)	TWA: 2 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>	TWA: 1.5 mg/m <sup>3</sup>	TWA: 4 mg/m <sup>3</sup> TWA: 1.5 mg/m <sup>3</sup>	-
Polypropylene (CAS #: 9003-07-0)	TWA: 5 mg/m <sup>3</sup>	-	-	-	-
Phosphate(1-), hexafluoro-, lithium (CAS #: 21324-40-3)		-	-	TWA: 1 mg/m <sup>3</sup> Skin	-

Chemical Name	Poland	Portugal	Spain	Switzerland	Netherlands
Copper (CAS #: 7440-50-8)	-	-	-	-	TWA: 0.1 mg/m <sup>3</sup>
Aluminum (CAS #: 7429-90-5)	TWA: 2.5 mg/m <sup>3</sup> TWA: 1.2 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>	TWA: 3 mg/m <sup>3</sup>	-

Chemical Name	Norway	United Kingdom	Australia	Austria	Belgium
Cobalt lithium manganese nickel oxide (CAS #: 182442-95-1)	TWA: 0.05 mg/m <sup>3</sup> TWA: 0.02 mg/m <sup>3</sup> TWA: 1 mg/m <sup>3</sup> TWA: 0.1 mg/m <sup>3</sup> STEL: 0.05 mg/m <sup>3</sup> STEL: 0.02 mg/m <sup>3</sup> STEL: 1 ppm STEL: 0.1 mg/m <sup>3</sup>	-	1 mg/m <sup>3</sup>	Skin STEL 2 mg/m <sup>3</sup> TWA: 0.5 mg/m <sup>3</sup>	-
Copper (CAS #: 7440-50-8)	TWA: 0.1 mg/m <sup>3</sup> TWA: 1 mg/m <sup>3</sup> STEL: 0.1 mg/m <sup>3</sup> STEL: 1 mg/m <sup>3</sup>	-	1 mg/m <sup>3</sup> 0.2 mg/m <sup>3</sup>	STEL 4 mg/m <sup>3</sup> STEL 0.4 mg/m <sup>3</sup> TWA: 1 mg/m <sup>3</sup> TWA: 0.1 mg/m <sup>3</sup>	-
Graphite (CAS #: 7782-42-5)	TWA: 5 mg/m <sup>3</sup> TWA: 2 mg/m <sup>3</sup> TWA: 10 mg/m <sup>3</sup> TWA: 4 mg/m <sup>3</sup> STEL: 5 mg/m <sup>3</sup> STEL: 2 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup> STEL: 4 mg/m <sup>3</sup>	-	3 mg/m <sup>3</sup>	STEL 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>	-
Aluminum (CAS #: 7429-90-5)	TWA: 5 mg/m <sup>3</sup> STEL: 5 mg/m <sup>3</sup>	STEL: 30 mg/m <sup>3</sup> STEL: 12 mg/m <sup>3</sup> TWA: 10 mg/m <sup>3</sup> TWA: 4 mg/m <sup>3</sup>	10 mg/m <sup>3</sup> 5 mg/m <sup>3</sup>	STEL 20 mg/m <sup>3</sup> TWA: 10 mg/m <sup>3</sup>	-
Phosphate(1-), hexafluoro-, lithium (CAS #: 21324-40-3)	-	-	2.5 mg/m <sup>3</sup>	-	-

**Appropriate engineering controls**

Ensure adequate ventilation, especially in confined areas. Remove all sources of ignition.

**Individual protection measures, such as personal protective equipment**

Respiratory protection	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
Hand Protection	Wear protective gloves.
Eye/face protection	No special technical protective measures are necessary.
Skin and body protection	Suitable protective clothing.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Information on basic physical and chemical properties**

Appearance	Solid
Color	No information available
Odor	No information available
Odor Threshold	Not determined
pH	Not determined
Melting point/freezing point	Not determined

<b>Boiling point / boiling range</b>	Not determined
<b>Flash point</b>	Not applicable
<b>Evaporation rate</b>	Not determined
<b>Flammability (solid, gas)</b>	Not flammable
<b>Flammability Limit in Air</b>	Not applicable
<b>Vapor Pressure</b>	Not determined
<b>Vapor density</b>	Not applicable
<b>Density</b>	Not determined
<b>Relative density</b>	Not determined
<b>Bulk density</b>	Not determined
<b>Specific gravity</b>	Not determined
<b>Water solubility</b>	Not determined
<b>Partition coefficient (LogPow)</b>	Not determined
<b>Autoignition temperature</b>	Not applicable
<b>Decomposition temperature</b>	Not determined
<b>Kinematic viscosity</b>	Not determined
<b>Dynamic viscosity</b>	Not determined
<b>Explosive properties</b>	Not an explosive
<b>Oxidizing properties</b>	Not determined

**Other information**

No information available

**10. STABILITY AND REACTIVITY****Reactivity**

Stable under recommended storage and handling conditions (see SECTION 7, handling and storage).

**Chemical stability**

Stable under normal conditions.

**Possibility of Hazardous Reactions**

None under normal processing.

**Conditions to avoid**

Strong heating. Incompatible materials.

**Incompatible materials**

Strong acids. Strong bases. Strong oxidizing agents.

**Hazardous Decomposition Products**

Carbon oxides (CO<sub>x</sub>), metal oxides.

**11. TOXICOLOGICAL INFORMATION****Information on likely routes of exposure**

Inhalation	Not an expected route of exposure
Eye contact	Dust contact with the eyes can lead to mechanical irritation
Skin Contact	No known effect based on information supplied
Ingestion	Not an expected route of exposure

**Information on toxicological effects****Acute toxicity**

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Iron (CAS #: 7439-89-6)	98.6 g/kg bw (rat)	-	-
Copper (CAS #: 7440-50-8)	> 2500 mg/kg bw(rat)	> 2000 mg/kg bw(rat)	=1.03 mg/L/4 h(rat)
Graphite (CAS #: 7782-42-5)	> 2000 mg/kg (rat)	-	> 2000 mg/m <sup>3</sup> /4h (rat)

Aluminum (CAS #: 7429-90-5)	LD50> 15900 mg/kg bw(rat)	-	LC50> 0.888 mg/L/4 h(rat)
Polypropylene (CAS #: 9003-07-0)	>5 g/kg	-	-

**Skin corrosion/irritation**

Non-irritating to the skin

**Serious eye damage/eye irritation**

No eye irritation

**Sensitization**

No information available.

**Germ cell mutagenicity**

No information available

**Carcinogenicity**

Chemical Name	ACGIH	IARC	NTP	OSHA
Cobalt lithium manganese nickel oxide (CAS #: 182442-95-1)	A3	-	Known	-
Polypropylene (CAS #: 9003-07-0)	-	Group 3	-	-

**Reproductive toxicity**

No information available

**STOT - single exposure**

No information available

**STOT - repeated exposure**

No information available

**Aspiration hazard**

No information available

**12. ECOLOGICAL INFORMATION**

**Ecotoxicity**

Chemical Name	Algae/aquatic plants EC50	Fish LC50	Crustacea EC50
Iron (CAS #: 7439-89-6)	-	13.6: 96 h <i>Morone saxatilis</i> mg/L LC50 static	> 100 mg/L/48h ( <i>Daphnia magna</i> )
Copper (CAS #: 7440-50-8)	0.031 - 0.054 mg/L/96h <i>Pseudokirchneriella subcapitata</i> static 0.0426 - 0.0535 mg/L/72h <i>Pseudokirchneriella subcapitata</i> static	1.25: 96 h <i>Lepomis macrochirus</i> mg/L LC50 static 0.3: 96 h <i>Cyprinus carpio</i> mg/L LC50 semi-static 0.8: 96 h <i>Cyprinus carpio</i> mg/L LC50 static 0.112: 96 h <i>Poecilia reticulata</i> mg/L LC50 flow-through 0.0068 - 0.0156: 96 h <i>Pimephales promelas</i> mg/L LC50 0.3: 96 h <i>Pimephales promelas</i> mg/L LC50 static 0.2: 96 h <i>Pimephales promelas</i> mg/L LC50 flow-through 0.052: 96 h <i>Oncorhynchus mykiss</i> mg/L LC50 flow-through	-
Graphite (CAS #: 7782-42-5)	> 100 mg/l/72h ( <i>Pseudokirchneriella subcapitata</i> )	> 100 mg/l/96h ( <i>Danio rerio</i> )	> 100 mg/l/48h ( <i>Daphnia magna</i> )

Aluminum (CAS #: 7429-90-5)	-	> 50 mg/L/96h	-
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**Persistence and degradability**

No information available

**Bioaccumulative potential**

No information available

**Mobility in soil**

No information available

**Other adverse effects**

No information available

**13. DISPOSAL CONSIDERATIONS**

**Waste treatment methods**

Disposal of wastes Disposal should be in accordance with applicable regional, national and local laws and regulations  
 Contaminated packaging Dispose of in accordance with federal, state and local regulations

Chemical Name	California Hazardous Waste Status
Cobalt lithium manganese nickel oxide 182442-95-1	Toxic
Copper 7440-50-8	Toxic
Aluminum 7429-90-5	Ignitable powder

**14. TRANSPORT INFORMATION**

According to International Maritime Dangerous Goods Code (2014 Edition), the products are not subjects/subject to dangerous.

**IATA**

UN/ID No. 3480  
 UN Proper shipping name Lithium ion batteries  
 Hazard Class 9  
 Packing Group II  
 Special precautions No information available  
 Marine pollutant Not applicable

**15. REGULATORY INFORMATION**

**International Inventories**

Component	AICS	DSL/NDL	EINECS/ELI NCS	ENCS	IECSC	KECL	PICCS	TSCA
Cobalt lithium manganese nickel oxide 182442-95-1 ( 30 - 32 )	-	-	-	-	X	-	-	X
Iron 7439-89-6 ( 22 - 23 )	X	X	X	Exempt	X	X	X	X
Copper 7440-50-8 ( 15 - 16 )	X	X	X	Exempt	X	X	X	X
Graphite	X	X	X	Exempt	X	X	X	X

7782-42-5 ( 14 - 15 )								
Aluminum 7429-90-5 ( 7 - 8 )	X	X	X	Exempt	X	X	X	X
Polypropylene 9003-07-0 ( 2 - 3 )	X	X	-	X	X	X	X	X
Phosphate(1-), hexafluoro-, lithium 21324-40-3 ( 2 - 3 )	X	X	X	X	X	X	X	X

"-" Not Listed

"X" Listed

**US Federal Regulations**

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	SARA 313 - Threshold Values %
Aluminum - 7429-90-5	1.0

**SARA 311/312 Hazard Categories**

Not applicable

**CWA (Clean Water Act)**

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Cobalt lithium manganese nickel oxide 182442-95-1	-	X	-	-
Copper 7440-50-8	-	X	X	-

**CERCLA**

Not applicable

**US State Regulations**

**California Proposition 65**

This product contains the following Proposition 65 chemicals

Chemical Name	California Proposition 65
Cobalt lithium manganese nickel oxide - 182442-95-1	Carcinogen

**U.S. State Right-to-Know Regulations**

This product may contain substances regulated by state right-to-know regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Cobalt lithium manganese nickel oxide 182442-95-1	X	-	-
Copper 7440-50-8	X	X	-
Graphite 7782-42-5	X	X	-
Aluminum 7429-90-5	X	X	X
Phosphate(1-), hexafluoro-, lithium 21324-40-3	X	-	-

**16. OTHER INFORMATION**

**Revision Note**



Issue Date 12-Jan-2016  
Revision date 10-Feb-2017  
Revision Note Update transport information

**Key or legend to abbreviations and acronyms used in the safety data sheet**

- TWA** - TWA (time-weighted average)
- STEL** - STEL (Short Term Exposure Limit)
- Ceiling** - Maximum limit value
- TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory
- DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List
- EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
- ENCS** - Japan Existing and New Chemical Substances
- IECSC** - China Inventory of Existing Chemical Substances
- KECL** - Korean Existing and Evaluated Chemical Substances
- PICCS** - Philippines Inventory of Chemicals and Chemical Substances
- AICS** - Australian Inventory of Chemical Substances

**Disclaimer**

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

----- End of Safety Data Sheet -----